

What are the rules of exponents?

Rule	Property	Example
Zero Exponent	$x^0 = 1$	$7^0 = 1$
Negative Exponent	$x^{-1} = 1/x$	$4^{-1} = 1/4$
<u>Product of Powers</u>	$x^m x^n = x^{m+n}$	$x^2 x^3 = x^{2+3} = x^5$
Quotient of Powers	$\frac{x^m}{x^n} = x^{m-n}$	$x^6/x^2 = x^{6-2} = x^4$

$$a^{-2} = \frac{1}{a^2}$$

ex: $x^0 = 1$

ex: $x^{-2} = \frac{1}{x^2}$

$$x^{-5} = \frac{1}{x^5}$$

$$\frac{1}{x^{-3}} = x^3$$

ex: $(x^2)(x^5) = x^7$
 $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$

$$2^2 \cdot 2^5 = 2^7$$

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 =$$

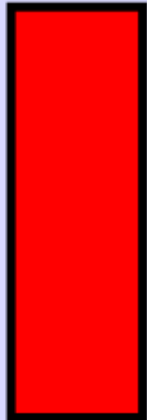
ex: $\frac{x^7}{x^4} = x^3$

$$\frac{x^4}{x^7} = x^{-3} \text{ or } \left(\frac{1}{x^3} \right)$$

What are the rules of exponents?

How do I use it?

Expression	Which Rule?	Simplified
x^7x^2	Product of Powers	x^9
$\frac{y^9}{y^5}$	Quotient of Powers	y^4
p^0	Zero Exponent	1
x^{-5}	Negative Exponent	$\frac{1}{x^5}$



What are the rules of exponents?

You Try!

Expression	Which Rule?	Simplified
z^8z^9	Product of Powers	z^{17}
$\frac{x^{11}}{x^{10}}$	Quotient of Powers	$x^1 = x$
7^{-2}	Negative Exponent	$\frac{1}{7^2} = \frac{1}{49}$
y^0	Zero Exponent	$y^0 = 1$
w^3w^3	Product of Powers	w^6

★	Power of a Quotient	$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$ ★	$\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}$
	Power of a Power	$(x^m)^n = x^{mn}$	$(x^2)^3 = x^{2 \times 3} = x^6$

Directions: Looking at the laws of exponents listed in the table above, simplify each expression below and name the rule that applies.

2.2.2

Expression	Rule	Simplified	Expression	Rule	Simplified
$\left(\frac{2}{p}\right)^3$	$\frac{2^3}{p^3}$	$\frac{8}{p^3}$	$(y^8)^8$	$y^{8 \cdot 8}$	y^{64}
$(x^5)^2$	$x^{5 \cdot 2}$	x^{10}	$(4^1)^3$	4^3	64
$(xy)^4$		$x^4 y^4$	$(yz)^6$		$y^6 z^6$
$(ab)^8$		$a^8 b^8$	$\left(\frac{x}{y}\right)^0$		1
$\left(\frac{t}{3}\right)^2$	$\frac{t^2}{3^2}$	$\frac{t^2}{9}$	$(3m)^3$	$3^3 m^3$	$27m^3$

What are the rules of exponents?

Calculate each problem and determine which answer in each row is the largest and circle it.

Row 1: $\left(\frac{2 \bullet 5}{10^2}\right)^2 =$

$\left(\frac{10^2}{2 \bullet 5}\right)^2 =$

$\left(\frac{2 \bullet 10}{2^2}\right)^2 =$

Row 2: $\frac{(2 \bullet 3)^2}{3^2} =$

$\frac{4^3}{(2 \bullet 4)^1} =$

$\frac{3 \bullet (4)^2}{2^3} =$

#1) $\left(\frac{10}{10^2}\right)^2 = (10^{-1})^2 = 10^{-2} = \frac{1}{10^2} = \frac{1}{100}$

#2) $\frac{6^2}{3^2} = \frac{36}{9} = 4$

$\left(\frac{10^2}{10}\right)^2 = (10)^2 = 100$

$\frac{64}{8} = 8$

$\left(\frac{20}{4}\right)^2 = 5^2 = 25$

$\frac{3 \bullet 16}{8} = \frac{48}{8} = 6$

25

3
1

Let's review...

<http://www.math-play.com/exponent-game.html>

Assignment:

Exponent Worksheet #1